

Modeling of Mass and Heat Transport in Membrane Distillation Process for Brackish Water Desalination

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PURPOSE OF STUDY

The future shortage of water resources necessitates research directed toward producing fresh water from brackish water sources. Reverse osmosis and thermal distillation are the current conventional methods used for desalination. Membrane distillation is a newer process that provides benefits such as lower operating temperatures and pressures. However, much more research is needed to determine the long term performance, operation, and maintenance of this relatively new technique. The researchers will develop comprehensive mass and heat transfer models to further understand the membrane distillation desalination process.

STUDY UNDERWAY

- The researchers will develop a mass transport model as well as a heat transport model for water vapor permeation through the membrane film.
- Energy requirements and salt reject efficiency will be studied theoretically, and then compared with experimental data.
- Theoretical analysis of the mechanisms for flux loss due to leakage will also be compared with experimental data.
- An integrated process model will be developed to predict the process performance at various operating conditions, and will then be verified by experimental data.

BENEFITS

- The models created in this study will help to optimize the membrane distillation process so that it may be used to produce potable water.



Prajwal Vikram, a graduate student pursuing a master's degree in chemical engineering at New Mexico State University, examines the solar collectors for a solar-powered desalination project.



Prajwal Vikram is working with the Dewevaporation Process for Brackish Water Desalination.

